A matter of style? Driver attributional 'style' in accounting for the driving of others as protective or as predisposing drivers towards retaliatory aggressive driving

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Abstract

Driver cognitions about aggressive driving of others are potentially important to the development of evidence-based interventions. Previous research has suggested that perceptions that other drivers are intentionally aggressive may influence recipient driver anger and subsequent aggressive responses. Accordingly, recent research on aggressive driving has attempted to distinguish between intentional and unintentional motives in relation to problem driving behaviours. This study assessed driver cognitive responses to common potentially provocative hypothetical driving scenarios to explore the role of attributions in driver aggression. A convenience sample of 315 general drivers 16-64yrs (M= 34) completed a survey measuring trait aggression (Aggression Questionnaire AQ), driving anger (Driving Anger Scale, DAS), and a proxy measure of aggressive driving behaviour (Australian Propensity for Angry Driving AusPADS). Purpose designed items asked for drivers' 'most likely' thought in response to AusPADS scenarios. Response options were equivalent to causal attributions about the other driver. Patterns in endorsements of attribution responses to the scenarios suggested that drivers tended to adopt a particular perception of the driving of others regardless of the depicted circumstances: a driving attributional style. No gender or age differences were found for attributional style. Significant differences were detected between attributional styles for driving anger and endorsement of aggressive responses to driving situations. Drivers who attributed the on-road event to the other being an incompetent or dangerous driver had significantly higher driving anger scores and endorsed significantly more aggressive driving responses than those drivers who attributed other driver's behaviour to mistakes. In contrast, drivers who gave others the 'benefit of the doubt' endorsed significantly less aggressive driving responses than either of these other two groups, suggesting that this style is protective.

Key words: Aggressive driving; Psycho-social factors; attributions; scenario-based

1. INTRODUCTION

The complexity of factors that are important to understanding aggressive driving, combined with differing definitions of what constitutes the phenomenon and how it should be operationalized, have made the task of developing useful models of aggressive driving difficult (Soole, Lennon, Watson & Bingham, 2011). In particular, the role of intention to cause harm, a primary feature motivational definitions of aggression widely used in psychology (Anderson & Bushman, 2002), has presented challenges to driving research, though many researchers now include driver intent in their definitions (e.g. Wells-Parker et al, 2002; Wickens, Wiesenthal, Flora & Flett, 2011). The inclusion of intention in definitions allows for a focus on understanding the motivations of drivers to engage in aggressive behaviours on-road and to the ability to distinguish between intentional and unintentional driving behaviours which may require quite different approaches to intervention.

Recently this has generated studies which explore the role of cognitive appraisals, in the form of attributions, in aggressive driving (e.g. Britt & Garrity, 2006; Lennon, Watson, Arlidge & Fraine, 2011; Vallières, Bergeron, & Vallerand, 2005; Wickens et al, 2011). Weiner's causal attributional model of social conduct (Weiner, 1986, 1995) has been one model used to provide a theoretical underpinning to such studies. Weiner's model posits that behavioural responses to the conduct of others in social situations (such as driving) are determined by an individual's affective responses, which are themselves determined by the person's cognitive appraisals. Cognitive appraisals are made by considering five causal dimensions (intentionality, controllability, locus, stability-consistency across time, and globality-consistency across situations) of the other's behaviour to reach an attribution as to the cause.

Findings from studies on aggressive driving based on Weiner's model have suggested that where the other is perceived as intentionally aggressive, greater anger is elicited and more aggressive responses are likely (Vallieres, Bergeron & Vallerand, 2005). Drivers have also been found to make attributions that were significantly more negative in response to other drivers whose intentions were depicted as clearly aggressive rather than ambiguous but potentially

aggressive (O'Brien, Shaw, Watson, & Lennon, 2012). In addition, for clearly intentional (rather than ambiguous) scenarios, drivers were more likely to endorse more aggressive behavioural responses. Conversely, where another driver is perceived as being in less control of the driving circumstances and not intentionally causing the negative driving event, perceptions of responsibility are lower, anger is less and drivers are less likely to endorse aggressive responses (Wickens, et al, 2011). Thus intentionality appears important to understanding driving attributions and aggression.

Stability has also been found to be an important dimension of Weiner's attributional model, and was the strongest predictor of anger as well as aggressive responding for all three of the driving situations used in Britt and Garrity's (2006) study of driver recollections of actual driving situations (being cut off, being tailgated by another, a slow driver). In this same study, attributions of blame or hostility were found to be important to drivers' reported levels of anger and the levels of aggression in their responses to scenarios depicting common trigger events (Britt & Garrity, 2006).

The current study was aimed at understanding driver cognitions and emotions in response to potentially provocative hypothetical, but common, driving events in order to clarify and refine modelling of the processes involved in aggressive driving. Although recent research has added to our understanding of motivational and psychological processes in driving, there is still much to be gained from elucidating and elaborating such processes. In particular, it is still unclear why milder forms of driver aggression, such as displays of hostility (rude gestures, horn honking) and more dangerous forms, such as tailgating, are perpetrated so commonly, despite apparent driver awareness of the risks of crashing from some of these more dangerous behaviours (Lennon & Watson, 2011; O'Brien et al, 2012). It is also unclear why drivers are willing to retaliate towards other drivers when they perceive them as behaving inappropriately. Previous qualitative work by the authors (Lennon & Watson, 2011) suggested that two key reasons that drivers behave aggressively towards others on-road are a desire to correct others' driving shortcomings or "teach them a lesson" about perceived unskilled behaviour, or when

they feel they have been on the receiving end of an intentionally hostile or aggressive action and are justified in retaliating. Accordingly, the aims of the current study were to examine the applicability of the authors' previous qualitative findings in relation to aggressive on-road incidents to a wider sample of drivers as well as to refine the modelling of aggressive driving processes. In particular we were interested in the attributions that drivers made of the causes of other drivers' behaviour as well as their anger and aggression in response to situations where the other driver's motives were intentionally aggressive compared to when these were ambiguous in intent.

2. METHOD

2.1 Participants

A convenience sample of general drivers (n = 315), 122 men (39%) and 193 women (61%) responded to the survey. Drivers were aged 16 years to 64 years, with mean age 34.3 years (SD = 14.3 years). The majority were open license holders (79.9%), with 19 being on Learner permits (6.5%) and 36 holding Provisional (restricted) licenses (12.2%). Three drivers were disqualified or had suspended licences (1.0%). Most participants were employed full time (60.2%) or part-time (14.6%), with a minority being students (12.6%). The majority had been drivers for at least 4 years (75.8 %), and indicated that they primarily drove to commute to work (58.8%) and primarily travelled on suburban roads (69.4%). A third drove on average 100-200 km per week (33.0%) with a further 18% driving 201-400 km per week.

2.2 Materials

2.2.1 Trait aggression . The Aggression Questionnaire (AQ) (Buss & Perry, 1992) was selected as a widely used and validated measure of trait aggression with the advantage of having sub-scales relate to separate forms of aggression. Participants responded to the full 29-item AQ (Buss & Perry, 1992) which consists of 29 statements (e.g. "I flare up quickly but get over it quickly"; "Once in a while I can't control the urge to strike another person") in four subscales to which the participant indicates the extent that the statement is characteristic of the

self on a 5-point Likert-like scale (1 = 'Extremely uncharacteristic' to 5 = 'Extremely characteristic'). Scores are obtained by summing the response values of the separate items, with higher scores indicating higher levels of aggression. Two items are reverse scored. The overall reliability of the full 29 items of the AQ has previously been estimated at Cronbach's α = .92, in a sample of 19-55 year old males (O'Connor, Archer & Wu, 2001). An Australian study reported reliability of α = .90 in a sample of 17-65 year old general drivers (O'Brien et al., 2012).

2.2.2 Driving Anger Scale (DAS).

The Driving Anger Scale (Deffenbacher, Oetting & Lynch, 1994) was chosen to assess participant tendency to angry driving, a behaviour that potentially elevates aggressive driving responses. Driving anger was assessed using the Driving Anger Scale (DAS) (Deffenbacher, et al., 1994). The full form of the DAS has 33 items measuring the level of anger a driver experiences in relation to 6 different types of driving situation (the 6 scales): Hostile gestures; Illegal driving; Police presence; Slow driving; Discourtesy; and Traffic obstructions. For each item, the driver indicates how angry he/she would feel on a 5 point Likert-scale (1 = 'not at all' 2 = 'a little' 3 = 'some', 4 = 'much', 5 = 'very much').

For the current study, the 14 item short form of the DAS was used. While the short form has the same six subscales as the full form, the truncated number of items in the short form renders the subscales unreliable as separate measures. Deffenbacher et al. (1994) reported an acceptable overall alpha reliability of .80 for the short form. In addition, the short form correlated at .95 with scores on the full form in the Deffenbacher et al. sample, with no gender effects found for the overall scores on either the short or the long forms. However, these researchers noted gender differences for four of the six subscales, leading them to conclude that men and women may have slightly different responses to some behaviours on the road. In addition to overall mean scores for both the long and short forms, Deffenbacher and colleagues provided norms for the student population (N = 1526) that they used in the development of the

scale. For the short form, these were M =46.9 (SD = 8.9) for women and M =47.2 (SD = 8.3) for men, while the 50% normative score was 47.

2.2.3 Driving behaviour (Propensity for Angry Driving Scale, Australian version -AusPADS).

In order to examine driving behaviour, a proxy measure of aggressive driving, the Australian adaptation of the Propensity for Angry Driving (AusPADS)(Leal & Pachana, 2008) was used. The original Propensity for Angry Driving Scale (PADS, DePasquale, Geller, Clarke, & Littlejohn, 2001) is a single-factor scale consisting of 19 short driving scenarios depicting potentially aggression-eliciting driving situations. There are four fixed response options, which range in aggression from mild or no aggression to extremely aggressive. Earlier work by the developers of the PADS (DePasquale et al, 2001) established the reliability and validity of the scale with a US-based driving population. Later work by Leal and Pachana (2008) adapted and shortened the scale for an Australian population, and then validated the adapted version using a smaller sub-set of drivers (Leal & Pachana, 2009). The AusPADS (Leal & Pachana, 2008; 2009) thus consists of 15 of the original 19 PADS scenarios, adapted in wording to an Australian driving audience. Examples of items and response options are given in Table 1. Responses for the AusPADS carry a score weighted according to the level of aggression. Participant scores are calculated by summing the item scores across the 15 items, with higher scores indicating more aggressive responding. Leal and Pachana (2008) reported a Cronbach's alpha of .82 for the 15-item scale, and a significantly gender difference with men having higher scores than women (M = 41.69, SD = 9.25, M = 38.48, SD = 8.54 respectively, $t(420) = 3.51$, $p < .001$). For the current study, three scenarios were excluded as they were deemed to be not closely related to on-road interactions between drivers (e.g. near-crash with a pedestrian, someone takes the car park space you have been waiting for), leaving 12 scenarios.

To examine the hypothesis that drivers will respond more aggressively to driving situations where other appears intentionally aggressive compared to those where the other driver's motives are unclear, the remaining 12 scenarios of the AusPADS were first categorised

as intentionally aggressive or of ambiguous intent on the basis of results from a pilot study with a small convenience sample of drivers (N = 36, mean age 23 years, range 17-41 years) drawn from an undergraduate psychology participant pool (participation was in return for course credit). Drivers in the pilot rated the intentionality of each of the AusPADS scenarios on a five point scale (1 = not at all intentional to 5 = completely intentional), and those scenarios where the mean rating of intentionality was greater than 4 and modal rating was 5 (that is agreement about intentionality was very high) were categorised as 'Intentional'. All other scenarios were categorised as 'Ambiguous'. Thus the intentionally aggressive category consisted of four scenarios, while the ambiguous intentionality category consisted of eight scenarios (12 scenarios in total).

2.2.4 Attributions.

A primary interest of this study was the driver cognitions in relation to potentially provocative driving situations. To capture these, participants were presented with a purpose-designed item. This item asked the participant to select the "…thought about the other driver [that] is most likely to go through…" his or her mind in response to the incident depicted in the AusPADS scenario. Response options consisted of four statements written in present tense and designed to represent one of four different attributions about the cause of the other driver's behaviour in the scenario. To formulate the attributions in the response options, two of the five dimensions from Weiner's causal attributional theory were used: intentionality, that is, whether the behaviour appeared intentional or not; and stability, that is, whether the behaviour appeared to be the result of state (temporary, such as mood) or trait (enduring, such as personality, other driver usually or typically behaves in this way) person-related factors. Choice of these two dimensions was based in part of the results of the earlier work by Britt and Garrity (2006), Vallieres et al, 2005 and Wickens et al (2011) cited above. A categorical, forced choice format was adopted for response options in order to align these with the types of cognitions/attributions drivers gave in the earlier qualitative study on aggressive driving (see Lennon & Watson, 2011; 2012) where drivers recalled their thoughts and emotions from real

driving aggression events. For the current study, the types of deffenbacherattributions from the earlier study were first categorised in terms of Weiner's dimensions of intentionality and stability to form four categories. The resulting attributional categories were as follows: that the other driver made a mistake or error (unintentional; unstable); that the other driver was a poor driver or lacked driving skills (unintentional; stable); the other driver was being selfish or rude (intentional; unstable); and that the other driver was a dangerous or risky driver (intentional; stable). Examples of the wording for the attributional response options were: "They obviously haven't seen me" ('mistake/error'); "What a terrible driver!" ('unskilled driver'); "What a rude driver!" ('selfish/rude'); and "What a menace! They shouldn't be allowed on the road!" ('dangerous'). Order of presentation of the different types of attribution was determined by random selection of the options (drawn from a hat) for each scenario.

Table 1: Examples of scenarios used from the Australian Propensity for Angry Driving (AusPADS, Leal & Pachana, 2008), with additional purpose-designed questions to assess level of anger and dominant attribution style.

Scenario 1 You are driving your car down a two-lane road. Without warning, another car pulls out in front of you from a car park. You have to brake suddenly to avoid hitting it. [Attributional item] **A**: Which of the following **thoughts** about the other driver is *most* likely to go through your mind? (please circle ***one***) a) Wow! They obviously just didn't see me b) What an idiot! They are obviously a pretty poor driver! c) How rude! d) What a menace! They shouldn't be allowed on the road! [Anger item] **B** In the above situation, please rate **how angry** you would feel on a scale of 1-5 where 1 = *not at all,* and 5 = *very much*. [Standard AusPADS response options] **C**: How would you **respond**? (Please circle ***one***) (a) Let out a sigh of relief and drive on (b) Lean out your window and yell at the other driver (c) Honk your horn to let the other driver know they almost caused an accident (d) Follow the car to its destination so you can give the driver a piece of your mind
Scenario 7 You are driving on the highway. One of the cars in front of you keeps changing lanes, preventing other cars from overtaking efficiently. Thus traffic is being slowed. [Attributional item] **A**: Which of the following **thoughts** about the other driver is *most* likely to go through your mind? (please circle ***one***) a) Where did they get their license? They are obviously a pretty poor driver! b) They mustn't have noticed how what they are doing is affecting everyone else c) What a menace! They shouldn't be allowed on the road! d) What a selfish driver!

[Anger item] **B**: In the above situation, please rate **how angry** you would feel on a scale of 1-5 where 1 = *not at all,* and 5 = *very much*.

[Standard AusPADS response options] **C**: How would you **respond**? (please circle ***one***)
(a) Yell obscenities in your car and honk your horn numerous times to show your displeasure
(b) Pull up next to the other car so that you can honk your horn and scream obscenities at the driver blocking traffic
(c) Yell out obscenities in your car
(d) Change lanes and move away so the driver doesn't affect you anymore

2.2.2 Anger in response to scenarios.

Based on the possibility that some drivers who might not generally be angry when driving yet might become angered in circumstances where another driver may seem responsible, such as in the specific situations depicted in the AusPADS, a second measure of anger was taken. Drivers were asked to rate their level of anger in response to each AusPADS scenario using a five-point Likert-type scale (1 = 'not at all' to 5 = 'very much') presented immediately following the item on attributions (see Table 1).

2.3 Procedure

Drivers were recruited during the day on weekdays and Saturdays, from locations close to the food-court areas of medium to large undercover shopping centres in two suburbs of Brisbane, Queensland. As both shopping centres had one or more major grocery retail (supermarkets) outlets, the researchers reasoned that these centres would draw customers from a broad demographic sector of the community. Recruiters were instructed to approach all passers-by who appeared to be aged between 18 and 65 years and invite their participation in the survey. Participants who agreed were first screened for eligibility (drive a car; Queensland drivers' license or learner permit; aged under 65 years) before being given the paper form of the survey and invited to complete it on the spot. Seating was available both close to where recruiters were stationed and also within the food-court areas. Participants who returned the completed survey were compensated $10 in cash for doing so. Response rates were not calculated as this method of recruitment does not allow for accurate determination of the non-response rate or reasons for not responding: typically shoppers who do not want to participate

actively avoid contact with the recruiter, making it impossible to know whether they are eligible to participate or understand the purpose of recruitment. However, refusal rates for those who spoke to a recruiter were low. Ethical clearance for the study was granted by the Queensland University of Technology Ethics Committee (Approval number: 090000682).

Analysis was carried out using the SPSS version 21statistical software package and included descriptive statistical procedures, t-test, chi-square test, and ANOVA procedures as described below.

3. RESULTS

3.1 Trait aggression (AQ)

In the current study, the overall mean score for the total AQ was M = 60.53, SD = 19.19 and Cronbach's alpha was .84 with all items included. Previous Australian work reported an overall AQ score of M = 46.96 (SD = 15.57) and found main effects of both age and gender on AQ scores, as well as a significant interaction (O'Brien et al, 2012). Accordingly, the current analysis was conducted with data stratified by age (17-29 years; 30-64 years) and gender combinations, resulting in four comparison groups (younger man, younger woman, mature–aged man, mature-aged woman). Results revealed significant group differences in trait aggression (see Table 2). Consistent with O'Brien et al.'s work (2012), age and gender appeared to interact in this sample, with mature-aged women having the lowest scores (M = 49.71, SD = 13.30) and younger men having the highest (M = 71.93, SD= 19.80, $p < .005$).

3.2 General driving anger (DAS)

For the whole sample, the mean total score for the DAS was M = 38.78, SD = 10.21. Similarly to Deffenbacher et al, (1994) and to a recent study of New Zealand drivers (Sullman & Stevens, 2013) there were no gender differences detected for total DAS scores (t = .278, df = 284, p = .781 ns), with M = 38.99, SD = 10.41 for men and M = 38.64, SD = 10.11 for women. Moreover, the overall mean anger levels for this sample appeared very similar to those reported

by Sullman and Stephens (2013) for their New Zealand sample (M = 38.17). However, there were significant differences between DAS scores in the current sample on the basis of age group, with drivers aged 40 to 64 years found to have significantly lower driving anger scores (M = 35.47, SD = 9.23) than the younger aged driver group (16-39 years, M = 42.33, SD = 10.10), t = 6.082, p < .001. This suggests that mature-aged drivers in this sample were less likely to experience anger in response to the driving situations depicted in the DAS, which in turn suggests that age is a protective factor for this sample in relation to becoming angry while driving.

3.3 Endorsement of anger and aggressive responses to the hypothetical scenarios (AusPADS)

For the current study, missing data on the AusPADS led to exclusion of 21 (6.7%) completed surveys from the analysis, leaving 294 valid sets of responses. Of these, 114 were men (39%), 180 were women (61%). The overall mean score for the AusPADS was M = 38.17, SD = 9.80. Responses to one scenario also had to be excluded as it appeared that drivers misunderstood the question, so analyses below are based on 11 remaining scenarios.

3.3.1 Anger

Mean level of reported anger in response to the scenarios overall was M = 2.59 (SD = 1.00) indicating that for most driving situations depicted, drivers had felt relatively angry. Consistent with results for the DAS, younger drivers (16-29 years) reported feeling significantly more anger (M = 2.95, SD = .99) than mature-aged drivers (30-64 years), (M = 2.30, SD = .88), t = 6.044, df = 284, p < .001, in relation to the scenarios, but no gender differences were detected (t = .382, df = 292, p = .181, ns).

3.3.2 Aggression

Analysis of the endorsement of aggression in response to the scenarios (the AusPADS scores) was conducted by gender and by age group in order for this to be consistent with the analysis for trait aggression and to allow detection of any age-gender interaction. Similarly to

the AQ, results suggested that there were significant differences both for gender (with men having significantly higher mean scores than women) and age (with younger drivers having significantly higher mean scores than mature-aged drivers), as well as an interaction between these for this measure (data not shown). Accordingly analyses were run with participants grouped according to age and gender as used for the AQ.

An ANOVA with adjusted alpha level of $p < .008$ revealed significant group differences, $F(3, 302) = 25.829$, $p < .001$ (see Table 2). Consistent with the literature in this area, post-hoc testing (Dunnett's T3) showed that younger men ($M = 45.48$, $SD = 12.59$) had significantly higher mean AusPADS scores than any of the other three groups, $p < .000$ – $p < .002$, indicating that young men were more likely to endorse aggressive responses to the driving scenarios. Younger women ($M = 38.44$, $SD = 9.05$) were statistically similar to mature-aged men ($M = 36.90$, $SD = 7.93$), and both had significantly higher mean scores than mature-aged women ($M = 32.66$, $SD = 5.31$), $p < .003$ and $p < .001$, respectively.

Table 2: Age/gender differences in scores on the AQ, DAS, and AusPADS

Measure	Overall mean score	Mean Scores by Age/gender grouping				
		Younger men 16-29 yrs	Mature men 30-64 yrs	Younger women 16-29 yrs	Mature women 30-64 yrs	Test statistic values and significance levels
AQ total score Possible range 39-195	60.21 (18.47)	71.93[a] (19.80)	58.98[b] (17.94)	64.62[ab] (16.68)	49.71[c] (13.30)	$F(3, 280) = 22.048$, $p < .001$
AusPADS Possible range 26.18-72.88	38.17 (9.80)	45.48[a] (12.59)	36.90[b] (7.93)	38.44[b] (9.05)	32.66[c] (5.31)	$F(3, 302) = 25.829$, $p < .001$

[abc]For rows, means with different superscripts were significantly different at $p < .008$ (Dunnett's T3)

3.3.3 Effect of depicted intentionality of the scenario on endorsement of aggressive responses

As described above, the 11 AusPADS scenarios were categorised as either intentionally aggressive (n = 4) or as ambiguous in intent (n = 7) in order to examine whether driver responses varied according to intention of the other driver.

T-testing revealed that drivers endorsed significantly more aggressive responses to the scenarios that were intentionally aggressive (M = 2.55) than to those that were of ambiguous intention (M = 2.47), $t = 2.435$, $df = 284$, $p < .05$, $\eta^2 = .02$. Thus these results are consistent with previous literature (Vallieres et al., 2005), and confirm that drivers are more likely to be aggressive when they perceive the other driver to be intentionally aggressive, though the amount of variance explained by scenario type is small in the current study, at 2%.

3.3.4 Attributional responses to the scenarios

In order to explore the relationship between driver attributions in response to the scenarios and endorsement of aggressive responses, counts of the number of times each participant endorsed each type of attribution were calculated across the 11 AusPADS scenarios (as above). This resulted in four separate 'scores' for each participant corresponding to the four attributions.

Inspection of the distributions of responses to the different types of attribution suggested that most participants may have a predisposition to endorse particular attributions regardless of the driving situation depicted in the scenario. That is, drivers appeared to be responding according to a cognitive or attributional style. To examine this possibility, drivers were classified into an attributional group (dominant attribution) on the basis of which attribution they had endorsed most frequently (highest count): the other made a mistake/error ('Mistake'); the other was a rude or selfish driver ('Selfish/rude'); the other was an unskilled/poor driver ('Unskilled driver'); and the other was a dangerous driver/menace ('Dangerous'). In cases where two or more attributions were equally most frequent,

participants were allocated to a fifth group 'No dominant attribution'. The numbers of drivers in each attributional group and results of the analyses are displayed in Table 3.

No gender differences were detected for dominant attribution (χ^2 = 6.340, df = 4, p = .175 ns) suggesting that no attribution was likely to be endorsed more by men than women. Similarly, there was no age effect, with younger (16-29 years) and mature aged (30-64 years) drivers equally likely to have any of the four attribution types as their dominant attribution (χ^2 = 2.893, df = 4, p = .576, ns).

Univariate analyses of variance were conducted (with Welch's test used to account for violations of the assumption of homogeneity of variance for the AusPADS measure) to determine whether there were significant differences in trait aggression (AQ), driving anger (DAS) and the endorsement of aggressive responses (AusPADS) on the basis of dominant attribution.

Although the models for each of these analyses were significant, post hoc testing (Dunnett's T3) revealed significant differences between groups for the DAS and AusPADS measures only (see Table 3). For the DAS, significant differences were detected between the drivers whose dominant attribution was that the other had made a mistake or error ('Mistake') (M = 35.46, SD = 9.81) and those whose dominant attribution was that the other was an unskilled driver ('Skills deficit') (M = 41.89, SD = 10.99) or a dangerous driver (M = 41.85, SD = 10.46). Similarly, for the AusPADS, the 'Mistake' group gave significantly less aggressive responses (M = 25.20, SD = 5.12) to the scenarios than did the 'Skills deficit' or the 'Dangerous' groups (M = 30.17, SD = 8.20; M = 29.53, SD = 7.99 respectively). These results suggest that the drivers whose dominant attribution was that the other had made a mistake were both less angry while driving generally and less likely to respond aggressively to the specific driving scenarios than those who saw the other as an unskilled/incompetent driver or a dangerous driver, while the converse was true for the 'Dangerous' and 'Unskilled' groups. Examination of

the Eta squared values for each of the variables suggests that the effect sizes varied slightly, though all are relatively modest.

Table 3: Descriptive data and group differences for 'Most frequently endorsed attribution' ('Mistake', 'Skills deficit', Rude/Selfish', 'Dangerous', 'No most frequent attribution') on measures of trait aggression (AQ), driving anger (DAS) and endorsement of aggressive responses (AusPADS).

Variable		N	Mean	SD	95% Confidence Interval for Mean		Test statistics and p values	Partial Eta sq (adj)
					Lower Bound	Upper Bound		
Aggression Questionnaire (total score)	No dominant attribution	55	58.40	15.41	54.23	62.57		
	Mistake	71	57.18	18.04	52.91	61.45		
	Rude/selfish	68	58.35	18.51	53.87	62.83		
	Dangerous	39	66.10	23.29	59.83	74.94		
	Skills deficit	42	67.39	16.87	60.84	71.35		
	Total	275	60.52	18.65	58.31	62.74	F (4, 270) = 3.344, p = 0.011	.03
Driving Anger Scale (DAS)-total score	No dominant attribution	55	38.44	9.26	35.93	40.94		
	Mistake	73	35.47[a]	9.81	33.18	37.75		
	Rude/selfish	70	38.61	9.78	36.28	40.95		
	Dangerous	41	41.85[b]	10.46	38.55	45.16		
	Skills deficit	47	41.89[b]	10.99	38.67	45.12		
	Total	286	38.78	10.22	37.59	39.97	F (4, 281) = 4.133, p = .003	.04
AusPADS (standard version, total score)	No dominant attribution	55	27.32	7.25	25.35	29.28		
	Mistake	69	25.20[a]	5.12	23.97	26.43		
	Rude/selfish	65	27.04	6.48	25.44	28.65		
	Dangerous	36	29.53[b]	7.99	26.83	32.23		
	Skills deficit	44	30.17[b]	8.20	27.68	32.67		
	Total	269	27.47	7.04	26.63	28.32	F (4, 114.745) = 4.600, p = .002	.05

[a,b] Within blocks, means with different superscripts differ at $p < .05$

In order to check whether there was any interaction between attributional style and the intentionality of the scenarios in terms of drivers' level of endorsement of aggressive responding, a two way (2 scenario type x 5 attributional groups) analysis of variance was conducted with the dependent variable being mean aggression endorsed. In keeping with results reported above, main effects for type of scenario ($F (4, 289 = 6.275$, $p = .013$, $\eta^2 = .021$) and attributional group ($F (4, 289) = 4.919$, $p = .001$, $\eta^2 = .064$) were detected, but there was no significant interaction detected between the two variables ($F (4, 289) = .821$, $p = .513$, ns). Thus,

although there were differences in the level of aggression endorsed by drivers with different attributional styles, drivers within each attributional group tended to respond at the same level of aggression to the intentional and the ambiguous scenarios.

4. DISCUSSION

4.1 Trait aggression and general driving anger

Results for the AQ in the current study are consistent with those of previous researchers in driving aggression and support the greater tendency among young men to endorse aggressive responses to provocative situations. In addition, there was an overall significant difference between the attributional styles in terms of the AQ. Although the post hoc tests were not significant, the 'Skills deficit' and 'Dangerous' attributional styles had the two highest AQ scores.

Drivers aged 40 to 64 years were found to have significantly lower driving anger scores than the younger aged driver groups, suggesting that being older was protective against anger in response to the types of driving situations depicted in the DAS. Though the current results are in contrast to those from previous US studies, with scores being substantially lower than those reported by Deffenbacher and colleagues (1994) for their US drivers, they are similar to more recent findings from a general sample of New Zealand drivers (Sullman & Stephens, 2013). One interpretation of these results is that Australian and New Zealand drivers are substantially less angry than US drivers. Alternatively, these lower overall scores may be due to the inclusion of more general situations in the items of the DAS (e.g. obstructions in traffic, police presence), which drivers in this sample may not have experienced as particularly angering, but simply part of normal driving. In contrast, driver anger in response to the scenarios on the AusPADS indicated moderately high overall anger, which lends weight to this second interpretation, at least for this sample of drivers. It would be useful to examine driver responses by partitioning scores into the standard DAS subscales, which are unreliable on the short form used in this study. However, future studies could use the DAS long form and

examine the subscales separately or alternatively, use only those sub-scales related to other drivers' behaviour.

4.3 Aggressive responding: AusPADS

As described above, differences in AusPADS scores were found on the basis of age and gender combined, making results difficult to compare with other Australian studies such as Leal and Pachana, (2009) which have only been examined on the basis of gender. However, when examined on age/gender groupings, unsurprisingly, and consistent with much of the literature on young drivers, the scores for the AusPADS suggest that younger men in this sample have significantly more propensity for endorsing aggressive driving responses to the scenarios depicted in the AusPADS than younger women or mature-aged drivers. Moreover, mature-aged women appear to have a significantly lower propensity to aggressive responses than any other group.

Results for responses to the intentionally aggressive and ambiguous scenarios in the current study were consistent with Weiner's (1986) theory of causal attribution and the findings reported by Wickens et al (2011), with drivers endorsing greater aggression in relation to situations where the other was intentionally aggressive. This is further confirms the importance of intentionality as a dimension in understanding driver aggression.

4.4 Attributions

Patterns in the results for attributional responses to the scenarios suggested that, rather than responding to the specific circumstances of the driving scenario presented to them, the majority of drivers have an attributional style of responding to the perceived transgressions of others, and that this style is not age or gender based.

Importantly, attributional style appears to be related to driving anger and aggressive responses. Drivers whose style was to give others the 'benefit of the doubt', (those drivers with a dominant attribution of 'Mistake') appear less angry about driving events generally than the drivers who tended to attribute the other driver's behaviour to him/her being a unskilled driver

or a dangerous one, as evidenced by their significantly lower DAS scores. Moreover, drivers with different styles differed in their levels of endorsement of aggressive responses, though the proportion of variance explained was at a modest level. One interpretation of these patterns is that drivers who are less angry when driving generally are also more likely to give others the benefit of the doubt in specific driving situations and thus are less likely to endorse aggressive responses to the behaviour of others on road. It is unclear whether the relationship is one of them being less angry as a result of having less negative or blaming attributions, or whether they are less blaming because they are less angry. For drivers who become relatively angry, the reverse may be true, with their being more easily angered while driving resulting in them being more likely to make attributions of the other as unskilled or dangerous and to respond more aggressively. Similarly, it is unclear whether the direction of this relationship is that greater anger leads to more negative attributions and greater aggression or whether a tendency to more negative attributions leads to greater anger and aggression. Application of Weiner's theory would suggest that the relationship is one where more negative attributions lead to greater anger and thus to greater aggression in response. Such an interpretation is also consistent with the relationships found by Vallieres et al., (2005) and by Wickens et al., (2011).

In considering the results in terms of the dimensions of Weiner's theory, it was the two high stability attributions (the other driver is unskilled or dangerous) which were associated with the higher levels of endorsed aggression, suggesting that where drivers attribute little likelihood that another's behaviour will change over time they will also be more likely to respond aggressively. This appears to contradict the result for the greater endorsement of aggression in response to the intentional versus ambiguous scenarios for the whole sample. One interpretation of our results that preserves the role of intention in Weiner's theory, and which would be consistent with both of our results, is that those with an attributional style that the other is unskilled may believe that the other should be responsible (whether they are or not), and thus judge them to be acting intentionally, and respond accordingly, leading to the same level of aggressive responding for both types of scenario within each of these styles. As

the current study did not directly ask drivers for their ratings of intentionality or of stability, it is not possible to determine whether drivers perceived the behaviours as intentional or not, or to what extent. The conclusions are thus limited to speculating about potential relationships, which is a limitation of the study and something that could be examined more closely in future work.

Alternatively, our results may be viewed as consistent with attributional style being associated with drivers making interpretations of current driving situations in a habitual direction, and thus leading to them responding to others as they are used to doing. For the more aggressive attributional styles, this is consistent with conceptualising their responding as scripted (Huesmann, 1988) for driving aggression: particular events on-road may facilitate the activation of a set sequence of thoughts, feelings and behaviours, including attributions of the other as unskilled or dangerous, and resulting in retaliatory aggressive responses. The trigger for this may be the driver's interpretation of any behaviour by other drivers that has a negative impact on the self as evidence of the other as an unskilled driver or a danger to other road users. Research in the general human aggression area has established that greater trait aggression predisposes individuals to perceive ambiguous information in more hostile ways, and to respond more aggressively as a result (Geen, 2001). As driving situations are frequently ambiguous, there are numerous opportunities for drivers to make such interpretations. It may also be that for the driving context, tendency to being angered by the driving behaviour of others similarly encourages hostile attributions and activates aggressive driving scripts, which over time become more accessible the more they activated (Huesmann, 1988).

Our results are consistent with this interpretation, especially when the responses to the intentionally aggressive versus ambiguous scenarios are considered across the groups. While we might have expected the difference in responses to the intentional versus ambiguous scenarios to be reflected within each attributional style, this did not occur. Instead, it appears that perceptions of the other driver's intention is less relevant to how drivers respond than their initial attribution about the causes of the other's behaviour, with the most negative/hostile

attributions likely to lead to greater feelings of justification for retaliation and aggressive responses.

Unfortunately, a limitation of the current study is that we are unable to explore or test these possibilities to determine which is more compelling. Future studies could use more scale-based measures or suitable measures of driving scripts and aim to explore potential mediating or moderating effects of attributions in the relationship between trait aggression, driving anger and driving aggression.

4.5 Implications for intervention

Being a mature-aged woman or a driver who is inclined to give others the benefit of the doubt when attributing causes to driving behaviour appears to be protective in relation to endorsing aggressive driving responses. A tendency to see the behaviour of others as due to them being unskilled drivers or dangerous drivers appears to be a risk factor for aggressive responding. These patterns suggest that interventions could be effective if focussed on assisting drivers to draw more self- and other-protective conclusions about why particular behaviours occur on-road: that is, to encourage interpretation of these as simply mistakes.

Alternatively, interventions could aim to influence the activation of driving scripts by encouraging drivers to apply a greater level of cognitive assessment of others' behaviours rather than allowing the activation of prescribed ways of interpreting and responding to others. One potential approach that has been showing promise in other driving areas is that of mindfulness (Abdul-Hanan, King & Lewis, 2011; Feldman, Greeson, Renna & Robbins-Montieth, 2011), which might be effective for reducing driving aggression in that it encourages greater awareness of, and attention to, the features of the specific situation, which might then avoid activating erroneous assumptions/interpretations, particularly hostile ones, about other drivers. In addition, mindfulness encourages acceptance of whatever one's current emotions may be and a non-judgemental stance on these in order to be able respond to circumstances in a flexible manner. This has potential benefits for driving choices in provocative situations.

The period where young people are forming their attributional styles in relation to driving would seem to be a critical time at which to try to influence the nature of attributions and scripts in relation to driving. This may be at the pre-learner or learner stage, though there is also evidence that attitudes towards driving may be formed much earlier through influences exerted from parents and other primary driving models (Fleiter, Lennon & Watson, 2009; Fleiter, Watson, Lennon & Lewis, 2006). Intervening with parents of young drivers to encourage them to model more protective attributional styles and greater reflectiveness or mindfulness in their approach to others on-road also seems relevant. Lessons from psychology in relation to influencing cognitive processes and attribution formation could thus be included in young driver learning materials as well as in the materials provided to parents who supervise or mentor young drivers. For more mature drivers, public education could attempt to encourage drivers to give others the benefit of the doubt, particularly in ambiguous situations or ones where it is clear that another driver's behaviour is not intended to cause offence or deliberately endanger other road users.

The current study did not explore in detail the reasons that drivers might make the particular attributions about the causes of others' driving behaviours, and so this is an area that may need further exploration.

4.6 Limitations

As well as the self-report nature of the survey, which may have influenced the extent to which drivers were willing to reveal angry thoughts or endorse more aggressive responses, the current study has limitations associated with the measures that were used. In particular, the forced choice nature of the attribution measure and the behavioural proxy measure in this study may have prevented participants from responding as they would have liked to or in a way that reflected their usual driving more accurately. Use of sliding scale-based measures for future studies would avoid this and would bring assessment of driver attributions and Weiner's attributional model more into line with those of previous studies.

Similarly, this study relied on responses to hypothetical written scenarios, which suffer from not being actual driving or recall of actual driving, and thus not necessarily eliciting drivers' typical on-road behaviour. Naturalistic driving studies could overcome this limitation, though they are substantially more costly and may samples may not draw on a broad demographic group.

Finally, the current study used a convenience sample of general drivers. Though this included drivers of varying ages, aggressive driving behaviour may be more relevant to younger drivers. However, general drivers are more representative of driving conditions encountered on typical driving trips, and are therefore valuable, especially as these have the potential to reveal information about the less extreme forms of aggressive behaviour that are encountered more frequently and which may be exhibited by drivers who might not normally conceptualise their behaviour, or themselves, as aggressive. This in turn is useful in intervening with general as well as young drivers.

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